

A TECHNIQUE TO MEASURE THE THERMAL DIFFUSIVITY OF HIGH T_c SUPERCONDUCTORS

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High T_c superconducting electrical current leads and ground straps will be used in cryogenic coolers in future NASA Goddard Space Flight Center missions. These superconducting samples will be long, thin leads with a typical diameter of two millimeters. A longitudinal method is being developed to measure the thermal diffusivity of candidate materials for this application. This technique will use a peltier junction to supply an oscillatory heat wave into one end of a sample and will use low mass thermocouples to follow the heat wave along the sample. The thermal diffusivity will be calculated using both the exponential decay of the heat wave and the phase shift of the wave. Measurements will be done in a cryostat between 10 K and room temperature.